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AUTHOR Clinkscale, Bella G.
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ABSTRACT

A study was undertaken to (1) determine the present state of the office environment by asking corporate officers, governmental officials, and educational administrators to take a close look at their personnel, procedures, and equipment and (2) determine what equipment, office systems, and personnel qualifications are anticipated for the future. The sample was drawn from businesses located in Ohio, Michigan, Indiana, Pennsylvania, and Canada. Names and addresses of firms were compiled from the Administrative Management Society Chapter Rosters for Area Six. A 160-item questionnaire was sent to 397 business organizations. One hundred ninety forms were returned. Responses from businesses of all sizes indicated that equipment is in use and that a trend toward computerized word processing is evident in the large office. In addition to word processing, the responses revealed that the office environment has changed considerably. The traditionally fixed walls, desks, and standard four-drawer file cabinets are becoming less common. With regard to changes anticipated within the next five years, respondents indicated the increasing need for data processing, word processing and an understanding of office systems. Also anticipated were changes in hiring standards and the need for more diversified skills and upgrading of job requirements. (JH)

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THE CHANGING OFFICE ENVIRONMENT

by

Bella G. Clinkscale, Ph.D.
Assistant Professor of Business Education

James J. Nance College of Business Administration
Cleveland State University
Cleveland, Ohio 44115

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THE CHANGING OFFICE ENVIRONMENT

INTRODUCTION

Technical advances, new business procedures, international involvement and multinational corporations are only a few forces that have contributed to the new demands on today's office workers. Although there has been steady progressing office technology, none has been as dramatic as in the past generation with the transition from:'

- manual typewriters to electric typewriters to automatic typewriters and word processing systems;
- manual PBX systems to automated PBX systems to electronic systems;
- dictating equipment with wax cylinders to wire recorders to magnetic tape to cassette tapes;
- special-paper copying machines to plain-paper high-speed, high-volume copiers;
- six-minute facsimile transmission of average quality to transceivers that simultaneously send and receive good quality messages in less than a minute;
- archival use of microfilm to active and vital micrographics that interface with computers;
- computers, still in their infancy, to computers of second and third generations (lehman).

Rising costs and the necessity for increased productivity create a need for even more change. Alan Purchase, a senior industrial economist at Stanford Research Institute, reported that "where office costs were 20 to 30 percent of the total in a company, they have now grown to 40 to 50 percent of all costs." Therefore, management is exercising greater selectivity in choosing personnel to fill office vacancies.

This is further supported by statements from Modern Office Procedure. Today, the simple recruiting process is obsolete. It has been made so by a variety of conditions:

- Clerical costs have risen sharply as white collar workers strive to reach the same wage levels as the unionized blue-collar group.

- High business volumes have brought on potential paperwork loads that cannot be handled efficiently by manual methods.

- There is always an inherent error factor in manual systems. Under low volume conditions it is tolerable. With high volumes, an error can cost thousands of dollars.

- As companies grow more complex and diversified, management must draw operating information from a wide variety of sources in order to make decisions and keep control. The press of competition demands that this be done quickly. Without automation, this process is clumsy at best--disastrous at worst.

- As companies, spread out over the whole country, good communications are necessary to maintain central control and keep the entire organization moving toward the same goals.

- Office space has become enormously expensive. Management is being pressured to find ways to house more people in smaller amounts of space--and to find ways to house records and documents in even smaller areas.

- The office environment has also come into focus as a factor contributing to both morale and efficiency. Proper use of expensive space demands that it be laid out to expedite workflow, and still serve as a pleasant and human-oriented place to work.

The roles of the office manager and the secretary in today's business office have taken on new dimensions. In the future, clerks and secretaries will no longer have to perform numerous, minute tasks of a routine nature such as addressing envelopes, preparing file folders, and arranging meetings. These tasks will be performed automatically as part of the total office system.

Furthermore, no longer will typewriting and shorthand alone qualify one for the title of secretary; nor will the title describe the job

classifications for which a person is often hired. The busy office executive will need someone with administrative abilities as well as one who fits the stereotyped requirements of typist and receptionist.

Most of the literature reveal at least two pronounced lines of thought prevalent in business education as to the future of the clerical worker: first, that machines will assume the routine clerical jobs that are now being accomplished by an enormous office force; and second, that the clerical worker roles will possibly change to that of administrative assistants, communication specialists, information specialists, data entry specialists, administrative systems analysts and administrative managers. These changes will accommodate the "Office of the Future."

THE PROBLEM

Much of the recent material found in books and periodicals about the office suggest that the office is in a state of transition. Emphasis is on the office systems concept and, especially, the integration of functions and activities. Realizing this transition, the first problem of this study was to determine the present state of the office environment by asking corporate officers, governmental officials, and educational administrators to take a close look at their present personnel, procedures, and equipment. The second problem of this study was to determine what equipment, office systems, and personnel qualifications are anticipated for the future.

Questions about office systems and integrated approaches were limited to two major areas: word processing and records management. Questions were also asked about the physical office environment.

THE PROCEDURE

Description of the Sample and Data Collection Procedures

The sample was drawn from businesses located in Ohio, Michigan, Indiana, Pennsylvania, and Canada. Names and addresses of firms were compiled from the Administrative Management Society Chapter Rosters for area 6. See Appendix C for geographic distribution of chapters and areas. The total sample was made up of all available businesses from area 6, who were, in turn, invited to participate in this project. Each was asked to complete the instruments described below.

Ten basic Standard Industrial Classifications were used: (1) Service; (2) Wholesale/Retail Trade; (3) Manufacturing; (4) Construction; (5) Finance/Real Estate; (6) Government; (7) Communications; (8) Public Utilities; (9) Agriculture; and (1) Mining. All other businesses responding were classified as Miscellaneous. Respondents were asked to indicate what equipment and systems their firms were presently using and what they plan to install within the next five years.

Data Collection

The data used in this study originated from 190 firms of the 397 business organizations to which questionnaires were mailed. The questionnaire and a letter of explanation were sent to the Administrative Management Society Member in each firm.

Source of the Data

The data for this study came from Business and Industrial Organizations. The source and the data supplied are listed below:

I. Business and Industrial Organizations

A. Basic Knowledge and Skill Requirements for Office Personnel

B. Anticipated Changes in Hiring Standards in the Next Five Years

C. Usage of: Shorthand and Machine Dictation

D. Standard and Automatic or Editing Typewriters

E. Reproducing Machines

F. Computing Machines and Equipment

G. Filing Equipment

H. Communicating Equipment

I. Office Furniture and Design

J. Records Management Systems

K. Word Processing Systems

Instruments

The questionnaire used for this study was designed by Kathleen P. Wagoner, Professor, College of Business, Ball State University, Muncie, Indiana. Where appropriate items were modified as the researcher felt that some of the original questions would not elicit the responses sought. The scale listed 160 statements about office systems and equipment. The respondents were asked to indicate, by checking the appropriate item, what equipment and systems their firms presently use; what it plans to install, either new or replacement, within the next five years; and general questions about the firm's changes in past office practices and structure.

Methods of Data Analysis

The information on each questionnaire was transferred to computer cards for subsequent detailed analysis. Two basic computer programs were utilized to evaluate the data base. The first program, frequency counts,

indicated the percentage of the total sample (or subsamples) responding in each of the possible ways to each of the questions. The second program, cross-tabulation, allowed analysis of two variables.

Significant variations were determined by computation of Chi-square values. These significant relationships at the .05 percent probability level are listed in Appendix A.

FINDINGS

The frequency count of the 160 item questionnaire indicated a high level of "no response" to questions dealing with more sophisticated types of equipment and systems that is lesser known in smaller offices (1 - 50 employees). However, some of the small offices are presently using or anticipate installing some of the more sophisticated equipment.

Table 1 indicates the distribution of responses from 190 businesses according to the type of business with the percentage of return in each classification of business indicated.

TABLE 1

Industrial Classifications
190 Businesses

Type of Business	Number Returned	Percent of Return
Service	48	25.1
Wholesale/Retail Trade	43	22.4
Manufacturing	39	20.3
Construction	11	5.6
Finance/Real Estate	13	7.2
Government	6	3.1
Communications	2	1.2
Public Utilities	3	1.5
Agriculture	2	1.0
Mining	1	.5
Other (Not Identified)	22	12.1

Table 2 indicates the distribution of the 190 responses from firms by the number of people employed.

TABLE 2

Total Employees by Size of Business

Number of Employees	Number of Companies	Percent of Return
1-10	6	3.2
11-50	29	15.7
51-150	21	11.4
151-500	45	24.3
501-1000	23	12.4
*Over 1000	61	33.0
Totals	190	100.0

Table 3 indicates the distribution of the 190 responses from firms by the number of office personnel employed.

TABLE 3

Number of Office Personnel

Number of Employees	Number of Companies	Percent of Return
1-10	34	18.4
11-50	27	14.6
51-150	24	13.0
151-500	35	18.9
Over 500	65	35.1
Totals	190	100.0

CHANGES IN BASIC KNOWLEDGE AND SKILL REQUIREMENTS OVER THE LAST FIVE YEARS

An extremely low 3 percent of the 190 respondents indicated that their companies have seen no change in basic knowledge and skill requirements for office personnel. General agreement, however, seems to be that change is occurring.

It is also evident that standards for skills required by businesses have not been lowered. Only 8 percent indicated that they believe standards have been lowered in the past five years. In contrast, 44 percent of the respondents indicated that job requirements have been upgraded.

Approximately half of the companies reporting (54%) indicated that there is less need for shorthand. However, 59 percent of the companies reported that there is need for more diversified skills, with data processing training indicated by 59 percent of the companies.

Responses concerning changes in requirements for typing was not so clearcut. Only 34 percent of the respondents indicated that they believe there is a need for increased typing speed. See Table 4.

Some of the respondents felt there were other areas of need for emphasis in in addition to basic skills and fundamentals. Comments written in at the end of the questionnaire included:

(1) There is an increased need for word processing skills--added to many offices.

(2) More emphasis is needed in fundamentals--mathematics, problem solving, speech and grammar.

(3) More emphasis should be directed to spelling and handwriting. Personal penmanship needs extra work.

(4) There are basic changes in careers.

(5) A better understanding of human behavior.

(6) Shorthand is valuable.

TABLE 4

Indicated Changes in Basic Knowledge and Skill Requirements For Office Personnel During the Last Five Years
190 Businesses

Indicated Change	Total Changes* Indicated Number	Firms Indicating Change Percent
Increased need for understanding office systems	128	72
Increased need for data processing training	103	59
Need for more diversified skills	96	54
Less need for shorthand	95	54
Job requirements have been upgraded	77	44
Increased typing speed	60	34
Standards have been lowered	15	8
Decreased typing skill requirements	5	3
No Change	6	
Other**		

*Firms had the option of checking more than one change. Most firms indicated several changes.

**Included written comments: Increased need for word processing; more emphasis on spelling, speech and grammar, handwriting, mathematics; understanding of human behavior needed; more emphasis on machine transcription; clerical/secretarial skills other than typing and shorthand; increased need for problem solving skills and interpersonal relations; there have been basic changes in careers.

(7) More emphasis needed in the area of machine transcription.

(8) Better clerical/secretarial skills other than typing and shorthand.

(9) Office employees must know how to work with people.

ANTICIPATED CHANGES IN HIRING STANDARDS

There is general agreement in the vast majority of companies as indicated in Table 5 that there is a need for more understanding of office systems. Of the total firms responding, 67% supported this needed change. Other anticipated changes indicated most frequently were (1) need for more diversified skills; (2) need for more EDP training; and (3) job requirements will be upgraded.

Only 6% of the companies responding indicated hiring standards will show no significant change in the next five years, and only 2% anticipate that standards will be lowered.

Comments written in as anticipated changes in hiring standards in the next five years included:

Better language skills.
Training must be tailored for business involved.
Understanding of human behavior.
Need for better gramatical and mathematical skills.
More management training required.
A knowledge of word processing.
Need for more mature attitudes.
Improved penmanship.

NEED FOR SHORTHAND

Many studies have been conducted on the future of shorthand. As indicated in Table 6, it is apparent that 71 percent of the companies responding believe that the need for shorthand writers is declining in proportion to the total number of office personnel. However, it is also apparent that the firms responding still feel that there is a need for shorthand. Only 37 percent indicated that their firms employ personnel

TABLE 5

Anticipated Changes in Hiring Standards in the Next Five Years
190 Businesses

Indicated Change	Total Changes* Indicated Number	Firms Indicated Change Percent
Need for more understanding of office systems	118	67
Need for more diversified skills	102	59
Need for more EDP training	98	55
Job requirements will be upgraded	81	46
Less need for shorthand	67	38
No significant change	12	6
Decreased typing skill requirement	5	2
Lower standards	4	2
Other**		

*Firms had the option of checking more than one change. Most firms indicated several changes.

**Included written comments: Better language and skills; training must be tailored for business involved; understanding of human behavior; need for better grammatical skills and mathematical skills; more management training; a knowledge of word processing; need for more mature attitudes; improvement in penmanship.

because of shorthand, although it may not be used on the job. However, 85 percent of the responding firms indicated that their firms employ office personnel who use shorthand on the job. In addition, 83 of the firms indicated that of the personnel who use shorthand on the job, they also transcribe dictation from a machine as well. Other replies indicated that 77 percent employ persons who take machine dictation, but not shorthand.

TABLE 6

Responses on Shorthand and Machine Dictation
190 Businesses

Characteristics of Firms	Responses Indicated	
	Number	Percent
Firms that employ office personnel who use shorthand on the job	159	85
Firms that employ office personnel because they know shorthand, even if it is not used on the job	68	37
Proportion of office personnel who take shorthand dictation and machine dictation		
None	29	16
Less than 1/4	54	31
1/4 to 3/4	20	11
1/2 to 3/4	27	15
3/4 to all	13	7
All	29	16
Firms employing persons taking machine dictation, but not shorthand	143	77
Firms indicating need for shorthand writers declining in proportion to the total number of office personnel	135	71

REASONS FOR USAGE OF DICTATION AND TRANSCRIBING MACHINES

An emerging high priority activity for the office of the future appears to be the usage of dictation and transcribing machines. Data analysis for this survey indicated that there is considerable use of this method for giving dictation. Approximately 7 percent of those responding indicated that they do not use dictating machines at all. Indications are, however, that a sizable number of employees are involved in either shorthand dictation or machine dictation, but not both (Table 6). For example, 77 percent of the firms employ persons to take machine dictation, but not shorthand dictation. In addition, 16 percent of the respondents replied that none of their personnel used both methods; and 31 percent replied that less than a fourth of their personnel used both methods.

Reasons for Use of Machine Dictation

The major reasons given for using machine dictation centered around convenience to the user, greater productivity and cost savings. One of the most important reasons indicated for the use of the dictating machines was that dictation could be given outside of office hours. Approximately 60 percent of the respondents as shown in Table 7 indicated this reason. Portability and accessibility of dictating equipment enable the dictator to use it at any time. Of the total respondents, 41 percent indicated that they use this equipment because of immediate accessibility. On the other hand, "personal preference" was the reason 42 percent of the respondents indicated for using dictating machines.

The cost factor was reflected as 50 percent of the respondents indicated that management considers the use of dictation machines to be

more economical. Other reasons in descending order of relative influence were: Centralized transcription, difficulty in obtaining competent shorthand writers, saves time, and too many interruptions for personal dictation.

Written comments from respondents were:

Word Processing is Available
Improved Efficiency of Secretarial Staff
Does not Tie up Two People's Time
For Convenience
One Secretary Serves Several People
More Efficient Use of Time

TABLE 7

Reasons for Use of Dictation Machines
190 Businesses

Indicated Reason	Number	Percent of Response*
Dictation given outside office hours	103	59
Management considers it more economical	87	50
Centralized transcription	73	42
Immediate accessibility	72	41
Personal preference	51	29
Difficult to obtain competent shorthand writers	12	6
Other:		
Word processing is available		
Improved efficiency of secretarial staff		
Does not tie up two people's time		
For manager's convenience		
One secretary serves four people		
More efficient use of time		

*Firms had the option of checking more than one item.

OFFICE EQUIPMENT PRESENTLY IN USE

Dictating Machine

The majority of the respondents used desk-top and portable dictating units as shown in Table 8. Centralized dictation units were used by 41 percent and approximately 40 percent used telephone dictation. Businesses using centralized or telephone dictation systems were mainly those with more than 150 office employees, although firms with as few as 11 office employees did indicate use of such systems.

Transcription Machines

The responses concerning transcription units also showed that businesses using computerized or supervisor controlled tank units, as well as automatic loading cassette systems were distributed throughout all size businesses and not just limited to the very large firms with 500 or more employees. A similar trend was indicated for the dictating machines. However, more firms indicated use of desk-top transcription units (62%) than centralized systems (41%). The use of magnetic belts was indicated by 36 percent of the firms, and magnetic tape cassettes were being used by 56 percent of the respondents. Use of magnetic discs, which is relatively new equipment on the market, was indicated by approximately 14 percent.

Manual and Electric Typewriters

Firms using electric typewriters were 96 percent of the respondents. Only seven firms, all having fewer than fifty employees, did not. In contrast, one hundred and twelve (112) of the total firms responding indicated that they were not using manual typewriters. Therefore, 41 percent of the respondents represent users of manual typewriters--78 users. Many firms use electric and manual typewriters.

TABLE 8

Usage of Dictation and Transcription Equipment
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Dictating Machines:	
Portable Dictation Units	69
Desk-Top Dictation Units	62
Centralized Dictation Units	41
Telephone Dictation Units	39
Transcription Machines:	
Desk-Top Transcription Units:	
Magnetic Tape Cassettes	56
Magnetic Belts	36
Magnetic Discs	13
Centralized Units:	
Automatic Loading Cassette System	25
Supervisor Controlled Tank Unit	8
Computer Controlled Tank Unit	8

*Some respondents indicated use of more than one type of equipment.

Automatic or Editing Typewriters

A considerable number of automatic or editing typewriters of various types were also being used. Of the 190 firms responding, 42 percent indicated that they use Mag Card Typewriters as shown in Table 9. Magnetic cards were the most commonly used medium of storage for automatic or editing typewriters. More respondents were using single card equipment than were using single tape equipment which was indicated by only 11 percent of the respondents. Dual Card and Dual Tape equipment was being used by approximately 20 percent of the respondents.

Although MTST equipment is no longer marketed on a large scale, 21 percent of the firms indicated that they are still using this equipment.

The memory typewriter was used by 31 percent of the firms responding, while only 12 percent indicated they were using automatic or editing typewriters with any type of disc storage.

CRT or Visual Display Equipment is being used by 25 percent of the respondents. In connection with this equipment, 15 of the respondents indicated that they are presently using computer output for some type of automatic or editing typewriting function.

Some use of the equipment for functions such as in-house printing was apparent, as 23 percent used the composer, and 17 percent indicated the use of phototypesetting equipment in conjunction with automatic or editing typewriters shown in Table 8. Some firms were using communicating automatic or editing typewriters; about 12 percent.

Use of Reproducing Machines

Copying equipment of some type is used by virtually every firm responding. Only eleven of the 190 firms responding indicated that they did not use copying equipment of some type. Four of those firms had eleven to fifty office employees and the other seven had from fifty to one hundred fifty office employees.

The major types of equipment used for multiple copy preparation were mimeograph, and offset equipment that prepares mats or masters for reproducing machines, liquid or spirit duplicator, and offset duplicator, as shown in Table 10. About 20 percent of the respondents use phototypesetting equipment for printing; also several respondents indicated printing was done by off-premise duplicating or printing services.

TABLE 9

Usage of Standard and Automatic or Editing Typewriters
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Electric Typewriters	96
Manual Typewriters	41
Automatic or Editing Typewriters:	
Mag Card	42
Memory Typewriter	31
Single Card	25
CRT or Visual Display	25
Composer	23
MTST	21
Dual Card	19
Dual Tape	18
Phototypesetting	17
Computer Output	15
Communicating	12
Disc	12
Single Tape	11

*Some respondents indicated use of more than one type of equipment.

It is interesting to note that the continued use of reproducing equipment is definitely an expected trend, for approximately two-thirds of the firms indicated they would install such equipment, new or replacement, within the next five years.

Use of Computing Machines and Equipment

Responses concerning the use of computing machines and equipment provided an interesting view of the level of sophistication of systems and procedures among the 190 small, medium, and large firms. Virtually

TABLE 10

Use of Reproducing Machines
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Copying Equipment	94
Offset Equipment that prepares mats or masters for any of the reproducing machines	55
Mimeograph	53
Offset Platemakers	38
Liquid or Spirit Duplicating	27
Offset Duplicators	23
Phototypesetting	20

*Some respondents indicated use of more than one type of equipment.

every respondent indicated that they use electronic calculators and adding machines. The percent of replies for each was 96 percent. As nearly all use electronic calculators, more than half (56%) used programmable calculators. More than half (58%) also use some type of accounting or bookkeeping machines as indicated in Table 11.

More than two-thirds of the firms responding indicated usage of the computer, with the majority relying on large or medium size computers as shown in Table 11; while, at the same time, approximately 50 percent indicated the usage of mini computers. Firms use a variety of different kinds of input and output equipment. Data Terminals are used by 61 percent of the firms, while 44 percent use Tab Card Equipment. Key to

magnetic equipment, punched tape equipment, and optical scanning or reading equipment followed, in descending order.

TABLE 11

Usage of Computing Machines and Equipment
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Electronic Calculators	96.3
Adding Machines	96.2
Computers, Large or Medium	64.0
Data Terminals	61.4
Accounting or Bookkeeping Machines	58.7
Programmable Calculators	56.3
Mini Computers	49.7
Tab Card Equipment	44.5
Computer-Output-Microfilm	40.9
Key to Magnetic Equipment	39.7
Punched Tape Equipment	32.6
Optical Scanning or Reading Equipment	31.1
Computer Text Processing	13.7

*Some respondents indicated use of more than one type of equipment.

Computer integration with other office functions is being used to some extent--with 40 percent of the firms indicating use of computer-output-microfilm, and approximately 14 percent indicating the use of computer text processing.

A number of respondents indicated by their written comments that they have additional contacts for service and computer needs with data processing service bureaus or through leasing or time-sharing of computers.

Use of Filing Equipment

There are a variety of styles and types of filing equipment. Although many new innovations have been introduced in filing equipment,

as shown in Table 12--96 percent of the 190 firms responding indicated that they still use some standard drawer files. Over half of the firms however, indicated some usage of lateral or broadside files (74%), and open shelf files (66%). The more sophisticated mechanized files, which would not be appropriate for all companies, were used by about one-third of the responding firms. Mechanized files were used primarily in firms with at least 500 employees and those employing more than 150 office personnel.

TABLE 12

Usage of Filing Equipment
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Standard Drawer Files	96.2
Lateral or Broadside Files	73.9
Open shelf Files	66.3
Mechanized Files	34.2
Microfilm Systems:	
Viewing Equipment	62.0
Filming Equipment	
Hard Copy Printout Equipment	50.0

*Some respondents indicated use of more than one type of equipment.

Microfilm equipment and systems are designed to speed up office operations, shrink storage space requirements, and provide management with better and faster information.

Microfilm equipment was used by a considerable number of businesses with viewing equipment being used by 62 percent of the respondents. On the other hand, 50 percent of the firms were using filming equipment, as well as hard copy print out equipment. Again, many firms indicated

they rely upon outside service bureaus to do filming, the same as they do for other service and computer needs. Also, all microfilming systems do not need hard copy printout.

Use of Communicating Equipment

Of the 190 firms responding, the equipment for long-distance communication installed most frequently was Teletype, TWX, or Telex representing 61 percent. Computer terminals for either on-premise or long-distance communication were being used by 58 percent of the respondents. Intercoms and paging systems, which facilitate on-premise communication, were used by approximately two-thirds of the firms responding. Other devices in use, although on a smaller scale, were facsimile (38%), interconnect (20%), and communicating typewriters (13%).

There is extensive use of high-speed communication in business firms today. This was apparent in responses concerning communicating equipment. (See Table 13). No attempt was made in this survey to distinguish between those companies with branches or affiliated divisions that would be even more likely to use intra-company communicating devices. However, usage was much higher in larger firms.

TABLE 13

Usage of Communicating Equipment
190 Companies

Type of Equipment	Percent of Those Replying Presently Using*
Teletype, TWX, or Telex	61.1
Intercoms--Paging Systems	61.4
Computer Terminals	58.8
Facsimile (Fax)	38.7
Interconnect	20.9
Communicating Typewriter	13.4

*Some respondents indicated use of more than one type of equipment.

Office Furniture and Design

Surroundings in which office employees perform their jobs, including office furniture and design, provide some understanding of what employers consider important as support in getting the job done.

To gain a better understanding of what firms are doing in this area some questions were asked about office furniture and design. A vast majority of the respondents (96%) indicated that they use conventional office furniture. A large percent of the firms (90%) also use office carpeting as indicated in Table 14.

Some form of partition was used by 65 percent of the firms, and 45 percent considered themselves to be presently using office landscaping. However, there was less use of screens (39%). Modular furniture and modular units were each reported as being used by 42 percent of the firms.

TABLE 14

Type of Office Furniture and Design
190 Businesses

Type of Equipment	Percent of Those Replying Presently Using*
Conventional Office Furniture	96
Office Carpeting	90
Partitions	65
Office Landscaping	46
Modular Furniture	42
Modular Units	42
Screens	39

*Some respondents indicated use of more than one type of equipment.

Records Management Systems

A key factor in the information chain is availability. Data must be easy to store and retrieve in order for it to benefit the user. Whether computer-generated or manually compiled, it must be readily accessable.

The use of microfilming systems for storage and retrieval of records was the one most frequently utilized by the companies responding (42%). About the same percentage of firms that used microfilming systems for filing purposes also indicated the integrated use of computer storage and retrieval for record keeping (41%). Fewer firms indicated the use of computer output microfilming (COM) for storage and retrieval (32%). This may be attributed to the large volume required to make such operations cost effective.

The integrated use of computer and communication equipment for long distance transmission of information was indicated by 29 percent of the respondents (Table 15).

TABLE 15

Office Activities and Procedures
190 Businesses

Activities	Percent of Those Replying Presently Using*
Records Management Systems	
Integrated use of:	
Microfilming systems for storage and retrieval of records	42
Computer storage and retrieval for records keeping	41
Computer output to microfilming records for storage and retrieval of records	32
Computer and communication equipment for long distance transmission of information	29

*Some respondents indicated use of more than one type of equipment.

Word Processing

Past studies report that organizations with Word Processing equipment and systems permit one secretarial support employee to produce more written business communications for more originators than organizations without Word Processing. Therefore, the long range outlook for word processing points steadily upward because of the proven savings and efficiencies of Word Processing systems.

As indicated in Table 16, respondents indicated that basically integrated use of equipment for word processing purposes combined dictating/transcribing equipment and automatic/editing typewriters. This involvement constituted 46 percent of the companies.

Integration within the Word Processing field of equipment for purposes of computer text processing, phototypesetting, reprographics and/or long-distance communications was limited to less than 15 percent of the respondents.

Other Changes

At the end of the questionnaire, respondents were asked to add comments about changes that had taken place in their offices or were contemplated in the area of integrated systems. Some replies indicated orientation to the systems concept and integration of functions and activities. Specific listings included:

1. Data collection system interface with keypunch
2. TWX interface with time-sharing computer
3. Video security system
4. Electronic inventory control system
5. Terminal-computer system
6. Computer to computer communication
7. Punch tape activated production machines
8. Tele-autograph (sic) communication system
9. Pen light activated CRT

TABLE 16

Word Processing Systems
190 Businesses

Activities	Percent of Those Replying Presently Using*
Word Processing Systems:	
Integrated use of:	
Dictating/transcribing equipment and automatic/editing typewriters	46
Dictating/transcribing equipment and computer text processing	18
Automatic/editing typewriters, phototypesetting, and reprographics	12
Computer text processing, phototypesetting, and reprographics	10
Automatic/editing typewriters, long-distance communications and reprographics	8
Automatic/editing typewriters, long-distance communications and reprographics	6

*Some respondents indicated use of more than one type of equipment.

SUMMARY

Office systems analysts continue to assure us that we are, indeed, headed toward a paperless office, and for integrated systems in large businesses, institutions and government. Therefore, management which always considers cost and productivity, is interested in the information processing function and how it is practiced in today's business office. This was supported by the large response received from the business firms to a questionnaire about present office practices and plans for the future. Also firms responding requested a summary of the findings.

Responses from businesses of all sizes indicated that equipment included in the survey is in use in offices. A trend toward computerized word processing is evident in the large office. Computers in use ranged from large, full-scale computers to micro processors. Respondents also indicated that the very large computers are used on a time-sharing basis.

In addition to word processing, the office environment has changed considerably. Office landscaping and flexible privacy panels are used in offices today. The traditional fixed walls, desks, and standard four-drawer file cabinets are becoming less common. Also in use in the office is the microfilm record system.

With regard to changes anticipated within the next five years, respondents indicated the increased need for data processing, word processing and an understanding of office systems. Respondents also indicated that they anticipated a change in hiring standards. The need for more diversified skills and upgrading of job requirements is anticipated.

Respondents generally appeared to consider shorthand desirable but not necessarily a required skill for the "Office of the Future."

A summary table of responses on equipment usage is presented below (Table 17).

TABLE 17

Summary Information of Office Equipment Presently Used in Businesses

Most frequently used equipment	Percent of Those Replying Presently Using
Dictating and Transcribing Machines	
Portable Dictation Units	69
Desk-Top Dictation Units	62
Centralized Dictation Units	41
Telephone Dictation Units	40
Desk-Top Transcription Units:	56
Magnetic Tape Cassettes	37
Magnetic Belts	
Typewriters	
Electric	96
Manual	41
Automatic or Editing Typewriters :	
Mag Card	42
Memory Typewriter	31
Reproducing Machines	
Copying Equipment	94
Offset Equipment that prepares Mats or Masters for any of the reproducing machines	55
Mimeograph	53
Offset Platemakers	38
Computing Machines and Equipment	
Electronic Calculators	96
Adding Machines	96
Computers, Large or Medium	64
Data Terminals	61
Accounting or Bookkeeping Machines	58
Programmable Calculators	56
Mini Computers	49
Tab Card Equipment	44
Computer-Output-Microfilm	41

Table 17 (continued)

Filing Equipment	
Standard Drawer Files	96
Lateral or Broadside Files	74
Open Shelf Files	66
Microfilm Systems:	
Viewing Equipment	62
Filming Equipment-Hard Copy Printout	50
Communicating Equipment	
Teletype, TWX, or Telex	61
Intercoms--Paging Systems	61
Computer Terminals	58
Facsimile (Fax)	39
Office Furniture and Design	
Conventional Office Furniture	96
Office Carpeting	90
Partitions	65
Office Landscaping	46
Modular Furniture	42
Modular Units	42

General comments written in by some of the respondents indicate that clerical workers of the future, the former office jack-of-all trades, is giving way to a specialist who helps make the people supported more productive. When the traditional clerical responsibilities are transferred to new office systems and equipment, a higher level of administrative support is provided.

THE FUTURE

What are the major changes of the systems or design of the Office of the Future? Although the future is difficult to predict, through examination of past and present trends we can establish likely courses of action.

Business firms participating in this survey were asked to indicate the office equipment they anticipated installing within the next five years, either new or as replacement. Some respondents gave evidence of careful planning concerning future acquisitions of office equipment and establishment of office systems. Many indicated future involvement in communications systems--word processing, interconnect telephone systems and information retrieval from computer banks. Others indicated that they will take advantage of equipment as it becomes available; utilize existing facilities and equipment to the very best advantage; rapidly move into micrographics; and use the modular concept in the office with acoustical screens, rugs, and workstations.

The level of "no response" and "don't know" indicated by the respondents about equipment and future systems reveal that many businesses do not know enough about the future to indicate what they anticipate installing. Most of the respondents are involved in specialized areas of responsibility and were, perhaps, not familiar with the questions aimed at the executive who performs multifunctions.

Dictation and Transcription Equipment

Plans for future installation of dictating and transcribing equipment follow patterns similar to present usage. Preference for portable dictation units is greater, however, than for desk-top units. Greater use of these smaller units is expected than of the larger centralizer or telephone dictation units. Respondents plan to install more magnetic tape cassette systems than magnetic disc or magnetic belt systems. Desk-top units for transcription will be used more frequently than the computer- or supervisor-controlled units.

Electric Typewriters

The use and purchase of electric typewriters apparently will remain high. Responses indicated that about three times as many firms are planning to purchase electric typewriters than are planning to purchase manual typewriters.

Automatic and Editing Typewriters

Although a number of firms appeared to be uncertain about future use of automatic or editing typewriters, those who responded indicated that they are planning to use the latest technological innovations as they become available. Types of equipment most commonly indicated for installation were:

-CRT or Visual display with either stand-along text revision typewriters or shared-logic computer text processing systems
-Computer output
-Memory typewriters
-Magnetic card
-Magnetic tape
-Floppy disc
-Composer
-Communicating
-Phototypesetting typewriters

Copying Equipment

Continued and frequent use of copying equipment is anticipated. Future installation of equipment for multiple-copy preparation differed markedly from present usage in that offset duplicators, which presently ranked sixth were first in anticipated installation; followed by mimeograph, and liquid or spirit duplicators.

Computers, Machines and Equipment

In the field of computers, machines and equipment, anticipated installations followed along the same lines as present installations,

with electronic calculators, adding machines, and data terminal as that to be most likely purchased. Following in descending order were:

Computers of larger or medium size
Programmable calculators
Accounting or bookkeeping machines
Mini-computers

Considerable interest for future installation was evident in both optical scanning or reading equipment and computer output microfilm. Key to magnetic equipment and computer text processing ranked about the same as tab card equipment and punched tape equipment. A few companies indicated they anticipated installation of tab card and punched tape equipment. This came as a surprise as these are generally considered obsolete for future office use.

Filing Equipment

Trends in anticipated use of filing equipment followed the same pattern as present usage. Responses in descending order were: standard drawer files, lateral or broadside file, open shelf files, and mechanized files.

Microfilming Equipment

Future plans about microfilming equipment indicated that more viewing equipment will be installed. There was an indication that more hard copy printout equipment will be installed than filming equipment. This can probably be accounted for because of off-premise filming by service bureaus.

Communicating Equipment

Computer terminals were ranked third in the responses related to types of communicating equipment presently used. The future plans

followed a different pattern as the respondents indicated that computer terminals ranked first in anticipated use. Following in order of plans for future use were: intercoms and paging systems Teletype, TWS and Telex; communicating typewriters, interconnect, and facsimile.

Office Furniture and Design

Plans for the future concerning office furniture and design did not vary from present patterns of usage. They were:

-Conventional Office furniture
-Office Carpeting
-Partitions
-Office landscaping
-Screens
-Modular furniture
-Modular units

It appears that the larger companies anticipate installation of significantly more modular furniture and units, screens and partitions.

Long range planning for several of the respondents included new office facilities.

IMPLICATIONS

Standard Research Institute predicts the "Office of the Future" will involve the interfacing of all types of present office equipment. Office systems analysts also continue to assure businesses that the "Office of the Future" will be paperless. Over half of the firms involved in this survey interface two or more systems in an effort to reduce the great volume of paper now generated, with the progress being made in word processing and other areas of micrographics.

The findings of this study indicate that medium-sized and large businesses support the supposition that considerable change is taking place in the office with regard to integration of functions and activities

in information processing, office environment, record management, and hiring standards. The greatest percentage of integrated applications in these areas was in businesses with sufficient information processing to warrent employing 150 or more office personnel.

Despite the fact that change is necessary to make the office more efficient many forces will, perhaps, tend to restrain this movement toward automation. Some factors are resistent to change and rearranging people to fit into the systems approach. Other problems that are likely to appear are: many managers in the present office structure will see the office of the future as a threat; and secretaries will probably feel threatened with loss of job security.

In any event, personnel in the office of the future will need more education in order to cope with the increasingly technical nature of office jobs. Also, the traditional boss-secretary relationship may not be the same.

On the other hand, many factors will promote change in the office. Equipment manufacturers, especially the giants, will be major forces in determining the future of the office with their philosophies of the developing state of technology and what sophisticated hardward should be.

Although administrative managers and their organizations may not take the major role in the development of what the future of the office will be, their roles will change considerably. They will assume the role of change agents. Therefore, administrative office managers must keep up to date on emerging technology and concepts. Managers must also be familiar with the systems concept which would provide for viewing problems from a wide perspective.

Perhaps even more significant, professional development programs will provide means for administrative managers to upgrade in the areas of problem solving, risk taking, inter-personal and communication skills and other basic skills related to the systems approach. Effectiveness in the future office environment is related to management.

The other major change agent, who will help to shape the new office environment, will be the business educator. The major role will probably be that of providing leadership in theory and direction which will be applied in specific business settings by administrative office managers.

The various implied changes may require business educators to retool periodically by conducting research, attending seminars, participating in work experience programs, and updating curriculum to meet the needs of "The Changing Office Environment."

APPENDIX A

PRACTICES IN LARGE FIRMS

(Over 500 Employees)

PRESENT PRACTICES

HIRING STANDARDS

Employ personnel because they have had shorthand, even if it may not be used on the job.

Employ office personnel who use shorthand on the job.

Employ office personnel who take dictation from a machine but do not take shorthand dictation.

REASON FOR USE OF DICTATING MACHINES

Reasons:

- Personal preference
- Immediate accessibility
- Dictation given outside office hours
- Management considers it more economical
- Difficult to obtain competent short writers
- Centralized transcription
- The need for shorthand writers is declining

DICTATION AND TRANSCRIPTION EQUIPMENT PRESENTLY USING

- Centralized dictation units
- Telephone dictation units
- Portable dictation units
- Desk-top dictation units
- Magnetic belt desk-top transcription units

AUTOMATIC OR EDITING TYPEWRITERS

Magnetic tape cassette desk-top transcription units
Automatic or Editing Typewriters

1. Mag card
2. Memory typewriter
3. Single card
4. CRT or visual display
5. Composer
6. MTST
7. Dual card
8. Dual tape
9. Phototypesetting
10. Computer output
11. Communicating
12. Disc

REPRODUCING EQUIPMENT

Copying Equipment
Liquid or spirit duplicating
Mimeograph
Offset duplicators
Copying equipment that prepares mats or masters for the above equipment
Offset platemakers

COMPUTING MACHINES AND EQUIPMENT

Electronic calculators
Programmable calculators
Mini computers
Computers, large or medium
Key to magnetic equipment
Tab card equipment
Punched tape equipment
Optical scanning or reading equipment
Data terminals
Computer-output-microfilm
Computer text processing

FILING EQUIPMENT

Lateral or broadside files
Open shelf files
Microfilm systems:
    Viewing equipment
    Filming equipment
    Hard copy printout equipment

COMMUNICATING EQUIPMENT

Teletype, TWX or Telex
Facsimile
Intercoms-paging systems
Computer terminals

OFFICE FURNITURE AND DESIGN

Carpeting
Partitions
Screens

WORD PROCESSING SYSTEMS

Integrated use of dictating/transcribing equipment and automatic/editing typewriters

Integrated use of automatic/editing typewriters, phototypesetting, and reprographics

Automatic/editing typewriters long-distance communications

Automatic/editing typewriters long-distance communications, and reprographics

RECORDS MANAGEMENT SYSTEMS

Computer storage and retrieval for record keeping

Microfilming systems for storage and retrieval of records

Computer output to microfilming systems for storage and retrieval of records

Computer and communication equipment for long-distance transmission of information

ANTICIPATED PRACTICES FOR THE NEXT FIVE YEARS

Dictation Equipment

Centralized dictation units
Portable dictation units
Desk-top dictation units

Transcription Machines

Computer-controlled tank units
Automatic loading cassette system
Magnetic belt desk-top transcription units
Magnetic tape cassette desk-top transcription units
Magnetic disc desk-top transcription units

Automatic or Editing Typewriters

1. CRT or visual display
2. Computer output
3. Memory typewriter
4. Mag card
5. Single tape and dual tape
6. Disc
7. Composer
8. Communicating
9. Phototypesetting

Reproducing Equipment

Phototypesetting
Offset duplicators
Copying equipment that prepares mats or masters
Offset platemakers

Computing Machines and Equipment

Computers, large or medium
Key to magnetic equipment
Tab card equipment
Optical scanning or reading equipment
Data terminals

Filing Equipment

Microfilm systems:
- Filming equipment
- Hard copy printout equipment

Communicating Equipment

Facsimile
Computer terminals

Office Design

Partitions
Screens

Word Processing Systems

Integrated use of:
Automatic/editing typewriters/
phototypesetting, and reprographics

Automatic/editing typewriters, long-distance
communications

Records Management Systems

Computer storage and retrieval for record keeping
Computer and communication equipment for long-distance
transmission of information

SMALL FIRMS ARE MORE LIKELY TO INSTALL IN THE NEXT FIVE YEARS THE FOLLOWING TYPES OF EQUIPMENT

Copying equipment
Electronic calculators
Microfilming systems:
viewing equipment

APPENDIX B

To assist the reader with a better understanding of office equipment and systems available on the market today, the following generic descriptions and definitions are offered for reference.

AUTOMATIC TYPEWRITERS
Designed to repeat-type form letters with little or no text manipulation.

CALCULATOR
Machine that performs mathematical operations.

CATHODE RAY TUBE (CRT)
A device similar to a television screen upon which data can be stored or displayed. When combined with a keyboard or electric pencil, can be an input-output on-line terminal.

COMMUNICATING TYPEWRITERS
Stand-alone text editors with the ability to communicate with other editors, computers, or special terminals in remote locations.

COMPOSER
A kind of automatic typewriter on which proportionally spaced camera-ready copy may be prepared. Fonts (for different styles of printing) are interchangeable and can be changed quickly to provide variety and contrast.

COMPUTER
Instrument for calculating or reckoning.

CONTINUOUS LOOP
A recorder system employing an endless loop of magnetic tape as the recording medium.

DISC STORAGE
Storage of data on discs which are much like a phonograph record in appearance and function.

ELECTRONIC DATA PROCESSING (EDP)
Handling recorded information through electronic devices.

ENDLESS LOOP
A sealed, continuous loop magnetic tape recording system.

FACSIMILE (FAX)
Equipment for the transmittal of exact copies of documents through regular telephone circuits.

KEY TO TAPE
Allows recording data directly onto magnetic tape in the format in which they were entered. Can be immediately processed by the computer.

KEYPUNCH
A keybpard-operated electro-mechanical device punches holes in the cards according to a prearranged code.

MC/ST
Mag Card Selectric Typewriter.

MT/SC
Magnetic Tape Selectric Composer.

MT/ST
Magnetic Tape Selectric Typewriter. These units are produced in several models, with a variety of options.

MAG CARD/MAG TAPE
Tape or card coated or impregnated with magnetic material on which information may be stored in the form of coded polarized spots.

MAGNETIC TAPE CASSETTE
Refers to two reels of 1/8" magnetic tape encased in a small, plastic or metal cartridge. Relatively inexpensive, it is used extensively in portable recording machines, the standard tape drive speed os 1-7/8 inches per second. Can store approximately 60,000 characters in text editing typewriter use.

OPTICAL CHARACTER RECOGNITION (OCR)
Computer input method whereby printed matter is "read" by the computer by way of an electric eye scanning technique.

PAPER TAPE
One of the recording mediums used in editing typewriter systems. Normally codes are recorded at 10 to the inch at a cost of approximately 3 cents per 1,000 characters.

PHOTOTYPESET
A photocomposing device with a built-in keyboard. The machine sets type automatically as the operator types on the keyboard. May be driven or controlled by other input equipment, most often through a coded paper or magnetic tape produced on some kind of keyboard or terminal or driven directly on-line from computers.

PUNCHED CARD EQUIPMENT
Mechanical or electronic equipment that uses cards in which holes have been punched in predetermined positions to "write" data.

PUNCHED PAPER TAPE
A strip of paper on which characters are represented by combinations of holes punched across the strip.

RECORDS MANAGEMENT
The systematic control of paperwork and records activities from their creation (as forms, reports, written instructions and correspondence), through their maintenance and use in active and inactive files, including their rapid retrieval when needed, to their final disposition or archival retention.

REEL-TO-REEL
Refers to those tape recorders which do not use a cassette or cartridge.

REPROGRAPHICS
Reproduction or printing of words and pictures; often on an in-house basis.

SHARED LOGIC SYSTEMS OR MINICOMPUTER BASED SYSTEMS
Consist of terminals linked to a centralized in-house computer which houses the logic, records the input, accomplishes the text manipulation, and on command furnishes the full output.

STAND ALONE TEXT EDITORS
All-in-one machines which handle all phases of text editing--initial keyboarding, recording on media, text manipulation, re-keyboarding, and final printout.

TANK RECORDER
A term for a continuous loop recording system.

TELETYPE
Equipment providing long distance machine-to-machine communication with printout on paper. Telex and TWX are brand names for such equipment.

TEXT EDITING
A category which generally implies the availability of an extensive repertoire of keyboard control keys and coded edit commands that can be used to control the storage/retrieval of text on the recording medium. Often will have two sequential media stations.

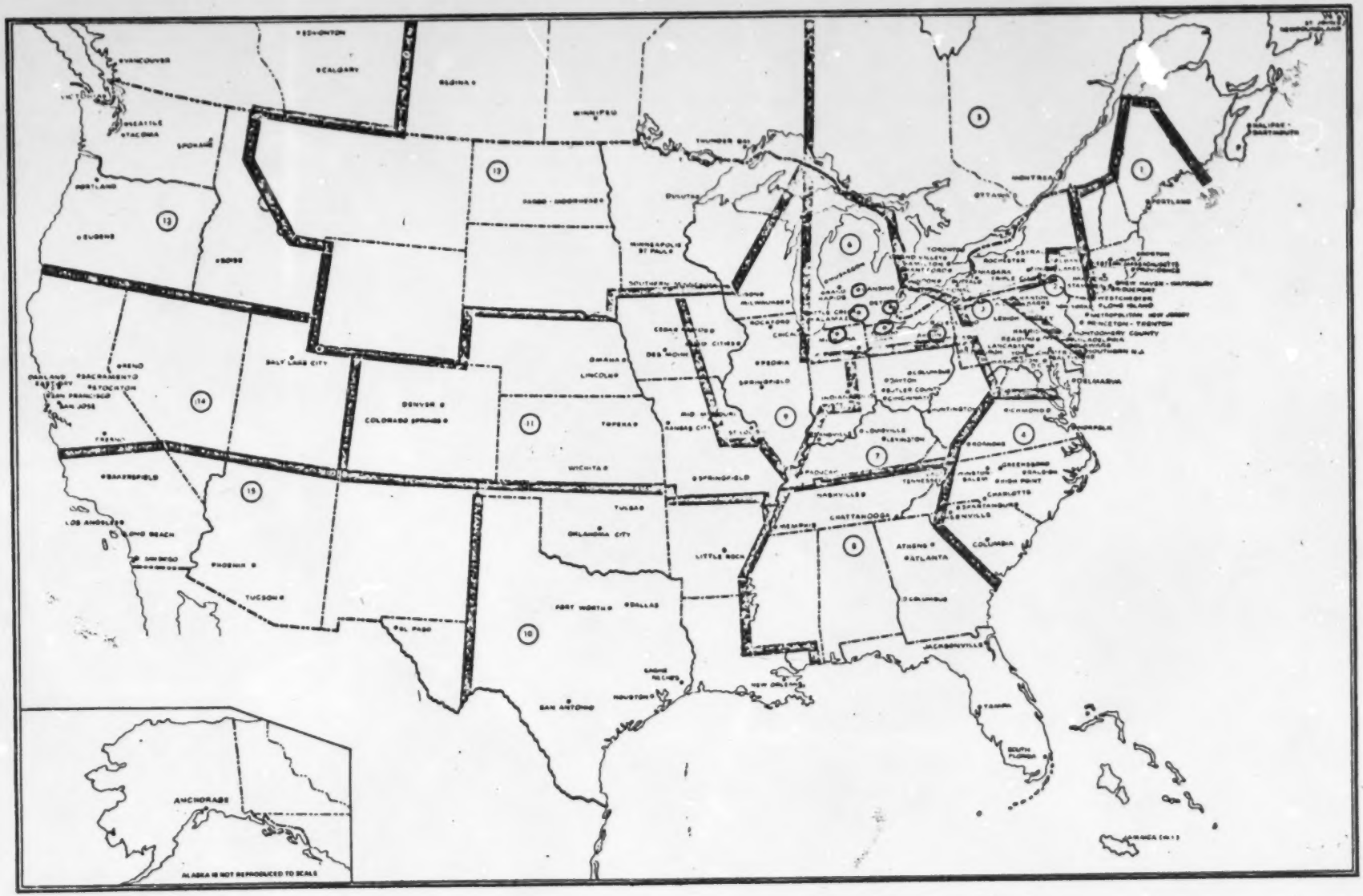
TIME SHARING
Splitting personnel or equipment, according to need, in two or more areas.

WORD PROCESSING
A way to transform ideas into written communication quickly and accurately through the use of automated equipment operated by skilled people using revised office procedures.

WORD PROCESSING SYSTEM
The combination of specific procedures, methods, equipment, and people designed to accomplish the transition of a written, verbal, or recorded word and distribution to its ultimate use.

APPENDIX C

GEOGRAPHIC DISTRIBUTION SHOWING CHAPTERS AND AREAS



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